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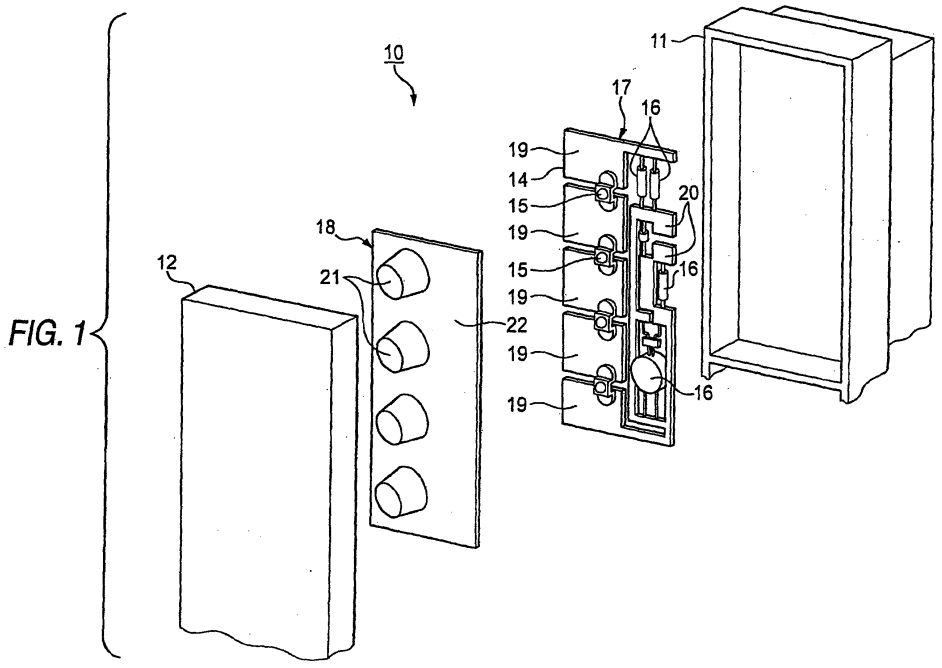
## (54) Vehicle lamp

(57) A vehicle lamp (10, 50, 60) includes a light source unit (17) and a light control member (18, 31, 33, 36, 39, 52, 68). The light source unit (17) includes a semiconductor light emitting device (15), an electronic component (16) which controls the semiconductor light emitting device (15), and a bus bar assembly (14) having a plurality of bus bars (19, 20) to which the semiconductor light emitting device (15) and the electronic component (16) are mounted to form a circuit. The light control member (18, 31, 33, 36, 39, 52, 68) is arranged directly in front of the light source unit (17) to control a light emitted from the semiconductor light emitting device (15). The light control member (18, 31, 33, 36, 39, 52, 68) has a fixing means (27, 54) for fixing the bus bar assembly (14) to the light control member (18, 31, 33, 36, 39, 52, 68) such that the light source unit (17) is held by the light control member (18, 31, 33, 36, 39, 52, 68). A resin base for supporting the bus bars or a circuit board for mounting the electronic components is not necessary. Accordingly, the number of components of the vehicle lamp (10, 50, 60) can be reduced.

FIG. 1




EP 2 194 311 A2

## Description

**[0001]** The present invention relates to a vehicle lamp having a light source unit, in which semiconductor light emitting devices and electronic components for controlling the semiconductor light emitting devices are mounted on a bus bar assembly, and a light transmitting member through which light emitted from the semiconductor light emitting devices is sent out.

**[0002]** In a conventional vehicle lamp, a positive bus bar, a negative bus bar, and a plurality of connecting pieces, via which leads of a plurality of light emitting diodes (LEDs) are electrically connected, are mounted on a resin base along a longitudinal direction of the resin base, and are covered by a lens body (see, e.g., JP 8-339707 A).

**[0003]** In another conventional vehicle lamp, a set of bus bars, to which LEDs are fixed, and another set of bus bars, to which electronic components are fixed, are supported on a resin base, and are covered by a front cover together with the resin base (see, e.g., JP 2008-084578 A).

**[0004]** As described above, the conventional vehicle lamps require a resin base to support the bus bars. Further, in some cases, a circuit board is separately required to mount the electronic components.

**[0005]** The present invention is made in view of the foregoing, and it is an object thereof to provide a vehicle lamp in which the number of components is reduced for cost reduction.

**[0006]** According to an aspect of the present invention, a vehicle lamp comprises a light source unit and a light control member. The light source unit comprises a semiconductor light emitting device, an electronic component which controls the semiconductor light emitting device, and a bus bar assembly comprising a plurality of bus bars to which the semiconductor light emitting device and the electronic component are mounted to form a circuit. The light control member is arranged directly in front of the light source unit to control a light emitted from the semiconductor light emitting device. The light control member comprises a fixing means for fixing the bus bar assembly to the light control member such that the light source unit is held by the light control member.

**[0007]** According to the vehicle lamp described above, the light source unit is configured such that the semiconductor light emitting device and the electronic component are mounted on the bus bar assembly to form a circuit. Further, the bus bar assembly is held directly by the light control member. Therefore, a resin base for supporting the bus bars or a circuit board for mounting the electronic components becomes unnecessary. Accordingly, the number of components of the vehicle lamp can be reduced.

**[0008]** According to another aspect of the present invention, the light control member may be a light transmitting member which is disposed to face an optical axis (Ax) of the semiconductor light emitting device.

**[0009]** According to another aspect of the present invention, a portion of the light transmitting member may have a light intercepting means which conceals the electronic component from view from outside the vehicle lamp. In this configuration, the electronic components, such as resistors and capacitors which form a control circuit, can be concealed from view from outside the vehicle lamp, while sending out the light emitted from the semiconductor light emitting device through another portion of the light transmitting member. Accordingly, it is possible to improve appearance of the vehicle lamp.

**[0010]** According to another aspect of the present invention, the bus bar assembly may be divided into two sections such that the semiconductor light emitting device is arranged on one of the sections and the electronic component is arranged on the other of the sections, and the portion of the light transmitting member having the light intercepting means may be positioned to face the other of the sections on which the electronic component is arranged. For example, the bus bar assembly can be vertically divided into right and left sections.

**[0011]** According to another aspect of the present invention, the vehicle lamp may comprise a light transmitting member which is disposed to face an optical axis (Ax) of the semiconductor light emitting device, and the light control member may be a light blocking member which is disposed between the light transmitting member and the light source unit. In this configuration, the light blocking member that supports the light source unit may be attached to a back face of the light transmitting member.

**[0012]** According to another aspect of the present invention, a portion of the light blocking member may have a light transmitting means through which the light emitted from the semiconductor light emitting device is transmitted toward the light transmitting member. In this configuration, the light blocking member can conceal the electronic components, such as resistors and capacitors which form a control circuit, from view from outside the vehicle lamp, while allowing the light emitted from the semiconductor light emitting device to be sent out from the light transmitting member. Accordingly, it is possible to improve appearance of the vehicle lamp.

**[0013]** According to another aspect of the present invention, the bus bar assembly may be divided into two sections such that the semiconductor light emitting device is arranged on one of the sections and the electronic component is arranged on the other of the sections, and the portion of the light blocking member having the light transmitting means may be positioned to face the one of the sections, on which the semiconductor light emitting device is arranged, such that the light transmitting means faces an optical axis (Ax) of the semiconductor light emitting device. For example, the bus bar assembly can be vertically divided into right and left sections.

**[0014]** According to another aspect of the present invention, the plurality of bus bars may be planarly arranged.

**[0015]** According to another aspect of the present invention, the light source unit may be directly attached to a back face of the light control member by the fixing means.

**[0016]** According to another aspect of the present invention, the vehicle lamp may further comprise a lamp body having an opening, and a transparent cover which is attached to the lamp body to close the opening so as to form a lamp chamber. The light source unit and the light control member may be accommodated inside the lamp chamber.

**[0017]** Other aspects and advantages of the invention will be apparent from the following description, the drawings and the claims.

**[0018]** Hereinafter, exemplary embodiments of the present invention will be described in detail with reference to the drawings including:

Fig. 1: an exploded perspective view of a vehicle lamp according to a first exemplary embodiment of the present invention;

Fig. 2: a vertical sectional view of the vehicle lamp of Fig. 1;

Fig. 3: an enlarged sectional view of a light transmitting member and a light source unit of the vehicle lamp of Fig. 2;

Fig. 4: a sectional view of the light source unit and the light transmitting member that are attached together;

Fig. 5: a horizontal sectional view of the light transmitting member of Fig. 3;

Fig. 6: a horizontal sectional view of a first modified example of the light transmitting member;

Fig. 7: a horizontal sectional view of a second modified example of the light transmitting member;

Fig. 8: a horizontal sectional view of a third modified example of the light transmitting member;

Fig. 9: a horizontal sectional view of a fourth modified example of the light transmitting member;

Fig. 10: an exploded perspective view of a vehicle lamp according to a second exemplary embodiment of the present invention;

Fig. 11: a vertical sectional view of a light transmitting member, a light blocking member, and a light source unit of the vehicle lamp of Fig. 10.

Fig. 12: an exploded perspective view of a vehicle lamp according to a third exemplary embodiment of the present invention; and

Fig. 13: a vertical sectional view of the vehicle lamp of Fig. 12.

**[0019]** First Exemplary Embodiment

**[0020]** A vehicle lamp 10 according to the first exemplary embodiment of the invention is a rear combination lamp. As shown in Figs. 1 and 2, the vehicle lamp 10 includes a lamp body 11 having an opening on a rear side with respect to a front-rear direction of the vehicle, and a cover 12 which is attached to the lamp body 11 to close the opening of the lamp body 11. The lamp body 11 may be made of resin, and is fixed to a vehicle body. The cover 12 is made of transparent resin which may be colorless, red or amber. The lamp body 11 and the cover 12 form a lamp chamber 13, inside which a light source unit 17 and an inner lens 18 (a light control member, a light transmitting member) are accommodated. The light source unit 17 includes a plurality of semiconductor light emitting devices 15, a plurality of electronic components 16, and a bus bar assembly 14 on which the semiconductor light emitting devices 15 and the electronic components 16 are mounted. In this embodiment, the semiconductor light emitting devices 15 are light emitting diodes (LEDs). The inner lens 18 is arranged directly in front (to the rear with respect to the front-rear direction of the vehicle) of the LEDs 15. The light source unit 17 is directly attached and fixed to the inner lens 18.

**[0021]** The bus bar assembly 14 includes a plurality of first bus bars 19 and a plurality of second bus bars 20. The first and second bus bars 19, 20 may be planarly arranged as in this exemplary embodiment. The first bus bars 19 are vertically aligned on a side where the LEDs 15 are arranged. The second bus bars 20 are disposed on a side where the electronic components 16 such as resistors and capacitors are arranged.

**[0022]** The LEDs 15 and the electronic components 16 are mounted on the bus bar assembly 14 to form a circuit. The LEDs 15 are electrically connected to the first bus bars 19 in series. More specifically, the LEDs 15 are vertically aligned on a section of the bus bar assembly 14 which is on the left in Fig. 1. The electronic components 16 are electrically connected to the second bus bars 20 to control the LEDs 15. The electronic components 16 are disposed on the other section of the bus bar assembly 14 which is on the right in Fig. 1.

**[0023]** The inner lens 18 is made of transparent and electrically-insulating resin which may be colorless, red or amber. The inner lens 18 has a shape similar to an external shape of the bus bar assembly 14.

**[0024]** The inner lens 18 has optical control portions 21 and a dummy portion 22. The optical control portions 21 are disposed on a side corresponding to the LEDs 15, i.e., on the left in Fig. 1. The number of optical control portions 21 is the same as the number of LEDs 15. The optical control portions 21 are vertically aligned such that each of the optical control portions 21 is aligned with an optical axis Ax of an associated one of the LEDs 15. The dummy portion 22 is disposed on a side corresponding to the electronic components 16, i.e., on the right in Fig. 1. The dummy portion 22 functions as a light intercepting means which intercepts a light from the outside of the vehicle lamp 10.

**[0025]** As shown in Fig. 2, the bus bar assembly 14 further includes three terminal pins 23 to which the first bus bars 19 and the second bus bars 20 are electrically connected. The terminal pins 23 extend into a male connector portion 24 which is formed at a central portion on

a rear surface of the lamp body 11. When the male connector portion 24 is fitted into a female connector 25, the terminal pins 23 are electrically connected to an external power circuit and an external control circuit, respectively.

**[0026]** As shown in Fig. 3, each of the optical control portions 21 of the inner lens 18 is formed with an LED accommodating recess portion 26 into which the associated one of the LEDs 15 is accommodated. The inner lens 18 has a plurality of fixing pins 27 (an example of fixing means) provided on a side (a back face) of the inner lens 18 that faces the bus bar assembly 14. The fixing pins 27 extend from the back face of the inner lens 18 toward the bus bar assembly 14.

**[0027]** The bus bar assembly 14 is formed with a plurality of fixing holes 28 (an example of fixing means), each receiving an associated one of the fixing pins 27. The fixing holes 28 are formed through the first bus bars 19 and/or the second bus bars 20 at positions facing the fixing pins 27.

**[0028]** As shown in Fig. 4, the fixing pins 27 of the inner lens 18 are inserted through the fixing holes 28 of the bus bar assembly 14. Then, the inner lens 18 and the bus bar assembly 14 are firmly attached together by applying, for example, a thermal riveting or an ultrasonic riveting to the fixing pins 27 on a back side of the bus bar assembly 14. Accordingly, the light source unit 17 is directly attached to the back face of the inner lens 18.

**[0029]** The fixing pins 27 may be provided on the bus bar assembly 14, and the fixing holes 28 are provided in the inner lens 18. Alternatively, the fixing means may have a configuration other than the pin and hole engagement.

**[0030]** As shown in Fig. 5, the inner lens 18 is formed with diffusing steps 29 on a portion of the back face of the dummy portion 22 that faces the electronic components 16. The diffusing steps 29 are configured to diffusely reflect the light from the outside of the vehicle lamp 10, e.g., irradiation light from a vehicle running behind.

**[0031]** The vehicle lamp 10 is configured such that, when a brake pedal of the vehicle is operated, the LEDs 15 are turned on, and the light emitted from the LEDs 15 is controlled to diffuse through the optical control portions 21 of the inner lens 18, and is rearwardly sent out from the vehicle lamp 10 through the transparent cover 12.

**[0032]** When the vehicle lamp 10 is irradiated with light entering from the rear of the vehicle, the light irradiating the vehicle lamp 10 is diffusely reflected by the diffusing steps 29 of the dummy portion 22 of the inner lens 18. Accordingly, the dummy portion 22 can conceal the electronic components 16 and the second bus bars 20 from view from outside the vehicle lamp 10.

**[0033]** Next, with reference to Figs. 6 to 9, modified examples of the light transmitting member of the vehicle lamp 10 will be described.

**[0034]** First Modified Example

**[0035]** As shown in Fig. 6, an inner lens 31 according to a first modified example has a reflecting layer 32 which is on a portion of a back face of a dummy portion 22 to face the electronic components 16. The reflecting layer 32 is form by, for example, coating or vapor deposition. The reflecting layer 32 is configured to diffusely reflect the light emitted from the outside of the vehicle lamp 10, e.g., irradiation light from a vehicle running behind. Accordingly, the reflecting layer 32 of the dummy portion 22 can conceal the electronic components 16 and the second bus bars 20 from view from outside the vehicle lamp 10.

**[0036]** Second Modified Example

**[0037]** As shown in Fig. 7, an inner lens 33 according to a second modified example is two colored. More specifically, the inner lens 33 has optical control portions 34 which are transparent, and a dummy portion 35 which is opaque or dark colored. Although the dummy portion 35 has no reflecting function, the dummy portion 35 is arranged to face the electronic components 16 so that the electronic components 16 and the second bus bars 20 are concealed from view from outside the vehicle lamp 10.

**[0038]** Third Modified Example

**[0039]** As shown in Fig. 8, an inner lens 36 according to a third modified example is molded to have a sheet-like shielding member 38 inside a dummy portion 37. The shielding member 38 may have a reflecting function. The dummy portion 37 inside which the shielding member 38 is disposed is arranged to face the electronic components 16 so that the electronic components 16 and the second bus bars 20 are concealed from view from outside the vehicle lamp 10.

**[0040]** Fourth Modified Example

**[0041]** As shown in Fig. 9, an inner lens 39 according to a fourth modified example has a portion of an extension member 40 which is installed inside the lamp chamber 13, and optical control portions 41 which are integrally molded with the extension member 40 or fitted in the extension member 40. The extension member 40 may be molded from colored resin. Additionally or alternatively, the extension member 40 may be processed by vapor deposition or coating.

**[0042]** The extension member 40 is configured to diffusely reflect the light emitted from the outside of the vehicle lamp 10, e.g., irradiation light from a vehicle running behind, thereby concealing the electronic components 16 and the second bus bars 20 from view from outside the vehicle lamp 10.

**[0043]** As described above, according to the vehicle lamp 10 of the first exemplary embodiment of the present invention, the inner lens 18, 31, 36, 39 holds the light source unit 17, in which the LEDs 15 and the electronic components 16 are mounted on the bus bar assembly 14, directly on the back part of the inner lens 18, 31, 36, 39. Thus, a resin base for supporting the bus bars and a circuit board for the electronic components become unnecessary. Consequently, the number of components can be reduced.

**[0044]** Moreover, because the resin base and the circuit board are not provided, heat generated from the elec-

tronic components 16 can efficiently be dissipated from the bus bar assembly 14.

**[0045]** Further, the bus bar assembly 14 is divided into right and left sections such that the LEDs 15 are mounted on one of the sections and the electronic components 16 are mounted on the other section, and the dummy portion 22, 35, 37, 40 of the inner lens 18, 31, 33, 36, 39 is arranged to face the section of the bus bar assembly 14 on which the electronic components 16 are mounted. According to this configuration, the inner lens 18, 31, 33, 36, 39 can conceal, by the dummy portion 22, 35, 37, 40, the electronic components 16 from view from outside the vehicle lamp 10, while allowing the light emitted from the LEDs 15 to travel through the optical control portions 21, 34, 41, which are respectively arranged to face the optical axes Ax of the LEDs 15.

**[0046]** Second Exemplary Embodiment

**[0047]** Next, a vehicle lamp 50 according to a second exemplary embodiment of the present invention will be described with reference to Figs. 10 and 11. In the following description of exemplary embodiments of the present invention, elements that are the same as or functionally similar to those of the first exemplary embodiment will be denoted by the same reference numerals, and detailed description thereof will be omitted.

**[0048]** As shown in Fig. 10, the vehicle lamp 50 includes a light blocking member 52 (a light control member), which is arranged directly in front of a light source unit and between an inner lens 18 and the light source unit 17. The light blocking member 52 includes a plurality of apertures 51 (an example of light transmitting means).

**[0049]** The light blocking member 52 is formed from a resin plate member, which has a certain thickness and which is opaque or dark colored. The apertures 51 of the light blocking member 52 are rectangular through holes, and are formed at positions that correspond to LEDs 15 respectively. The apertures 51 are not limited to the rectangular through holes, and may be circular through holes.

**[0050]** As shown in Fig. 11, a plurality of fixing pins 54 (an example of fixing means) are provided on a side (a back face) of the light blocking member 52 that faces a bus bar assembly 14. The fixing pins 54 extend from the back face of the light blocking member 52 toward associated fixing holes 53 (an example of fixing means) of the bus bar assembly 14.

**[0051]** Each of the fixing pins 54 of the light blocking member 52 is inserted through the associated one of the fixing holes 53 of the bus bar assembly 14. Then, the light blocking member 52 and the bus bar assembly 14 are firmly attached together by applying, for example, a thermal riveting or an ultrasonic riveting to the fixing pins 54 on a back side of the bus bar assembly 14. Thereafter, the light blocking member 52 and the inner lens 18 are joined by ultrasonic welding or bonding by use of an adhesive agent, the inner lens 18 and the bus bar assembly 14 are firmly attached together with the light blocking member 52 interposed therebetween.

**[0052]** The fixing pins 54 may be provided on the bus bar assembly 14, and the fixing holes 53 are provided in the light blocking member 52. Alternatively, the fixing means may have a configuration other than the pin and hole engagement.

**[0053]** According to the vehicle lamp 50 of the second exemplary embodiment, the bus bar assembly 14 is fixed to the back part of the light blocking member 52, whereby the light source unit 17 is directly held by light blocking member 52. Thereafter, the light blocking member 52, which holds the bus bar assembly 14, is attached to a back face of the inner lens 18. Thus, a resin base for supporting the bus bars and a circuit board for the electronic components become unnecessary. Consequently, the number of components can be reduced.

**[0054]** Moreover, because the resin base and the circuit board are not provided, heat generated from the electronic components 16 can efficiently be dissipated from the bus bar assembly 14.

**[0055]** Further, the bus bar assembly 14 is divided into right and left sections such that the LEDs 15 are mounted on one of the sections and the electronic components 16 are mounted on the other section, and the light blocking member 51 is provided in a portion of the light blocking member that faces the section on which the LEDs 15 are mounted. Accordingly, the light emitted from the LEDs 15 can travel toward the inner lens 18 without being blocked by the light blocking member 52, while concealing the electronic components 16 from view from outside the vehicle lamp 50.

**[0056]** Third Exemplary Embodiment

**[0057]** Next, a vehicle lamp 60 according to a third exemplary embodiment of the present invention will be described with reference to Figs. 12 and 13.

**[0058]** As shown in Fig. 12, the vehicle lamp 60 has a tail lamp 63 inside a lamp chamber 62 which is formed by a lamp body 61 and a transparent cover 64.

**[0059]** An inner lens 68 (a light control member) of the vehicle lamp 60 includes optical control portions 65, a dummy portion 66, and a tail lens 67.

**[0060]** As shown in Fig. 13, the lamp body 61 has a socket 69 to which a tail lamp bulb 70 is attached.

**[0061]** The tail lens 67 is provided below the optical control portions 65 and the dummy portion 66. The optical control portions 65, the dummy portions 66, and the tail lens 67 may be formed as a one-piece structure. Diffusing steps 71 are formed on a back face of the tail lens 67. The inner lens 68 has fixing means like the inner lens 18 of the first exemplary embodiment to fix and to hold the light source unit 17.

**[0062]** In the vehicle lamp 60 having the configuration described above, the tail lamp bulb 70 is turned on when a lighting switch (not shown) is switched on. Further, the LEDs 15 are turned on when a brake pedal is operated. Light emitted from the LEDs 15 is controlled to diffuse through the optical control portions 65 of the inner lens 68 so as to travel on towards the transparent cover 64, and is transmitted through the transparent cover 64 to-

ward the rear of the vehicle.

**[0063]** According to the vehicle lamp 60 of the third exemplary embodiment, the tail lamp 63, which is usually treated as a lamp functioning differently, is integrally provided inside the lamp body 61. Accordingly, the vehicle lamp 60 can be modularized to have an integrated configuration.

**[0064]** The present invention is not limited to the foregoing exemplary embodiments, and various changes and modifications can be made therein without departing from the spirit and scope of the present invention as defined by the appended claims. Further, the materials, shapes, dimensions, forms, numbers, positions, etc. of the elements of the exemplary embodiments are not limited to those described above, and are optional within the spirit and scope of the present invention as defined by the appended claims.

**[0065]** For example, the number of LEDs is not limited to that illustrated in the drawings, and is selected in accordance with vehicle designs and required functions.

**[0066]** Further, while the vehicle lamps of the exemplary embodiments described above are rear combination lamps, the present invention is also applicable to a front combination lamp.

## Claims

**1.** A vehicle lamp (10, 50, 60) comprising a light source unit (17) and a light control member (18, 31, 33, 36, 39, 52, 68),
wherein the light source unit (17) comprises:

> a semiconductor light emitting device (15);
> an electronic component (16) which controls the semiconductor light emitting device (15); and
> a bus bar assembly (14) comprising a plurality of bus bars (19, 20) to which the semiconductor light emitting device (15) and the electronic component (16) are mounted to form a circuit,

**characterized in that** the light control member (18, 31, 33, 36, 39, 52, 68) is arranged directly in front of the light source unit (17) to control a light emitted from the semiconductor light emitting device (15), and **in that**
the light control member (18, 31, 33, 36, 39, 52, 68) comprises a fixing means (27, 54) for fixing the bus bar assembly (14) to the light control member (18, 31, 33, 36, 39, 52, 68) such that the light source unit (17) is held by the light control member (18, 31, 33, 36, 39, 52, 68).

**2.** The vehicle lamp (10, 60) according to claim 1, wherein the light control member comprises a light transmitting member (18, 31, 33, 36, 39, 68) which is disposed to face an optical axis (Ax) of the semiconductor light emitting device (15).

**3.** The vehicle lamp (10, 60) according to claim 2, wherein a portion of the light transmitting member (18, 31, 33, 36, 39, 68) comprises a light intercepting means (22, 35, 37, 40, 66) which conceals the electronic component (16) from view from outside the vehicle lamp (10, 60).

**4.** The vehicle lamp (10, 60) according to claim 3, wherein the bus bar assembly (14) is divided into two sections such that the semiconductor light emitting device (15) is arranged on one of the sections and the electronic component (16) is arranged on the other of the sections, and wherein said portion of the light transmitting member (18, 31, 33, 36, 39, 68) is positioned to face the other of the sections on which the electronic component (16) is arranged.

**5.** The vehicle lamp (50) according to claim 1, further comprising a light transmitting member (18) which is disposed to face an optical axis (Ax) of the semiconductor light emitting device (15), wherein the light control member comprises a light blocking member (52) which is disposed between the light transmitting member (18) and the light source unit (17).

**6.** The vehicle lamp (50) according to claim 5, wherein a portion of the light blocking member (52) comprises a light transmitting means (51) through which the light emitted from the semiconductor light emitting device (15) is transmitted toward the light transmitting member (18).

**7.** The vehicle lamp (50) according to claim 6, wherein the bus bar assembly (14) is divided into two sections such that the semiconductor light emitting device (15) is arranged on one of the sections and the electronic component (16) is arranged on the other of the sections, and wherein said portion of the light blocking member (52) is positioned to face the one of the sections, on which the semiconductor light emitting device (15) is arranged, such that the light transmitting means (51) faces an optical axis (Ax) of the semiconductor light emitting device (15).

**8.** The vehicle lamp (10, 50, 60) according to any one of claims 1 to 7,
wherein the plurality of bus bars (19, 20) are planarly arranged.

**9.** The vehicle lamp (10, 50, 60) according to any one of claims 1 to 8,
wherein the light source unit (17) is directly attached to a back face of the light control member (18, 31, 33, 36, 39, 52, 68) by the fixing means (27, 54).

**10.** The vehicle lamp (10, 50, 60) according to any one of claims 1 to 9, further comprising a lamp body (11,61) having an opening and a transparent cover

(12, 64) which is attached to the lamp body (11, 61) to close the opening so as to form a lamp chamber (13, 62), wherein the light source unit (17) and the light control member (18, 31, 33, 36, 39, 52, 68) are accommodated inside the lamp chamber (13, 62).

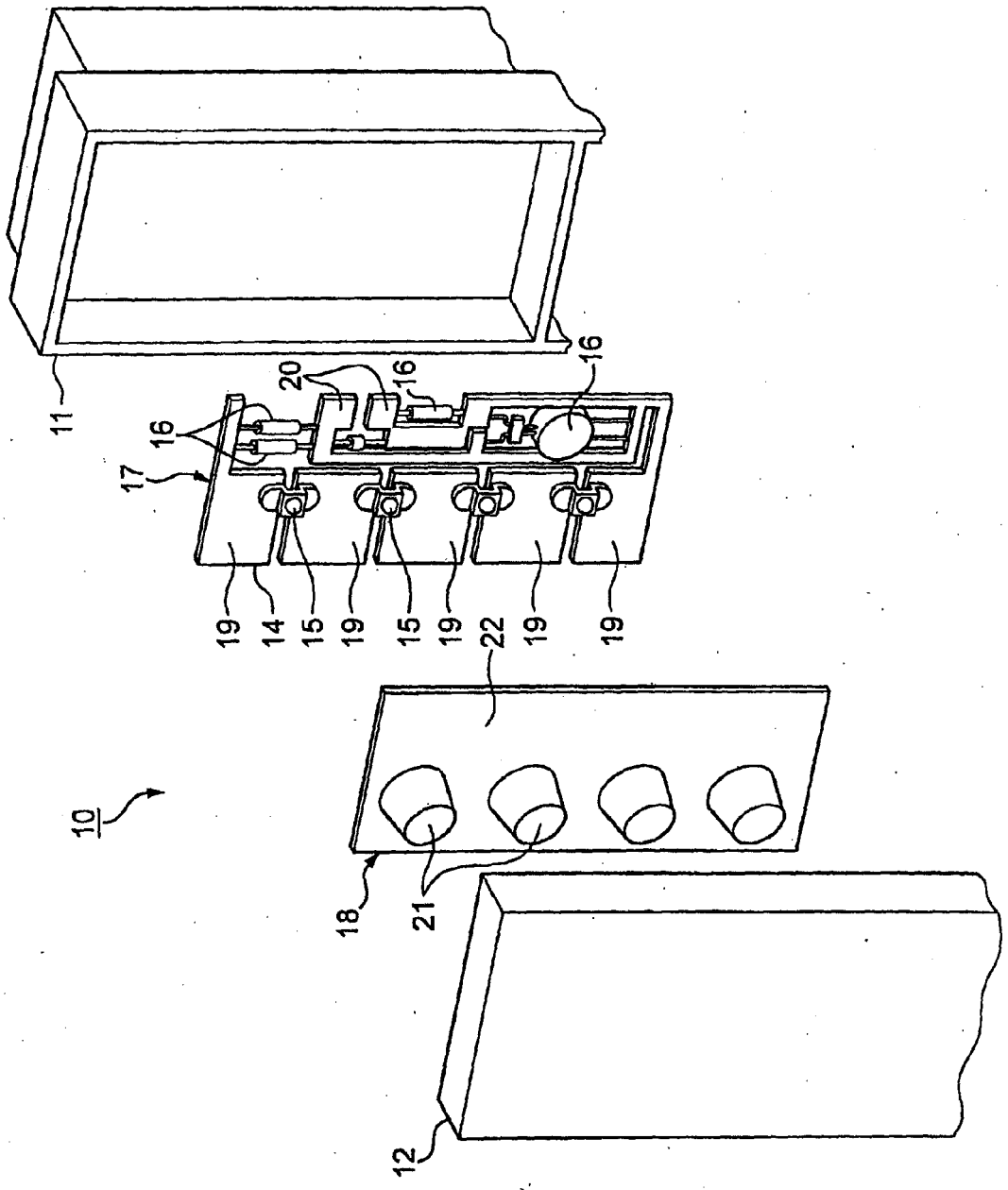



FIG. 1

FIG. 2

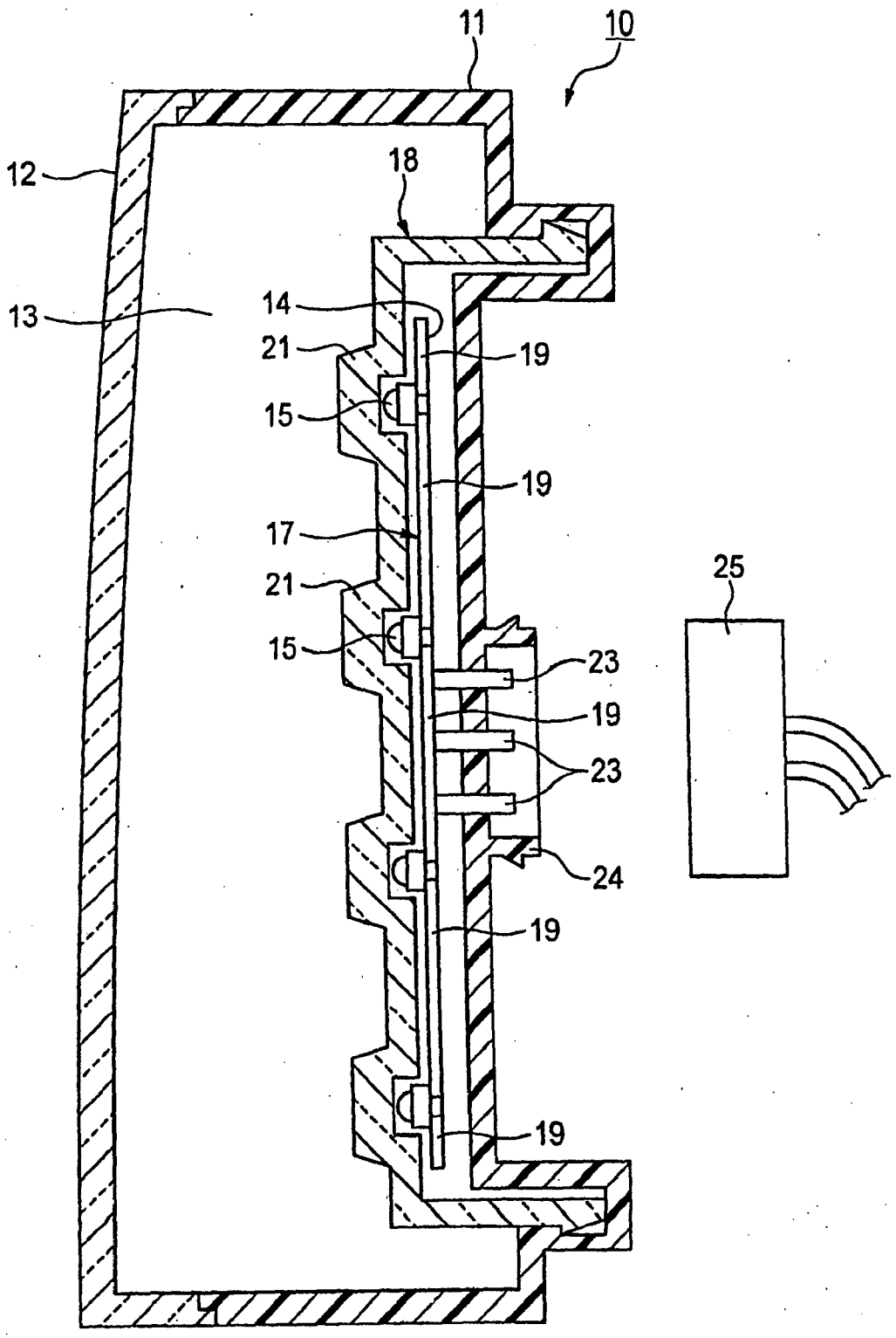


FIG. 3

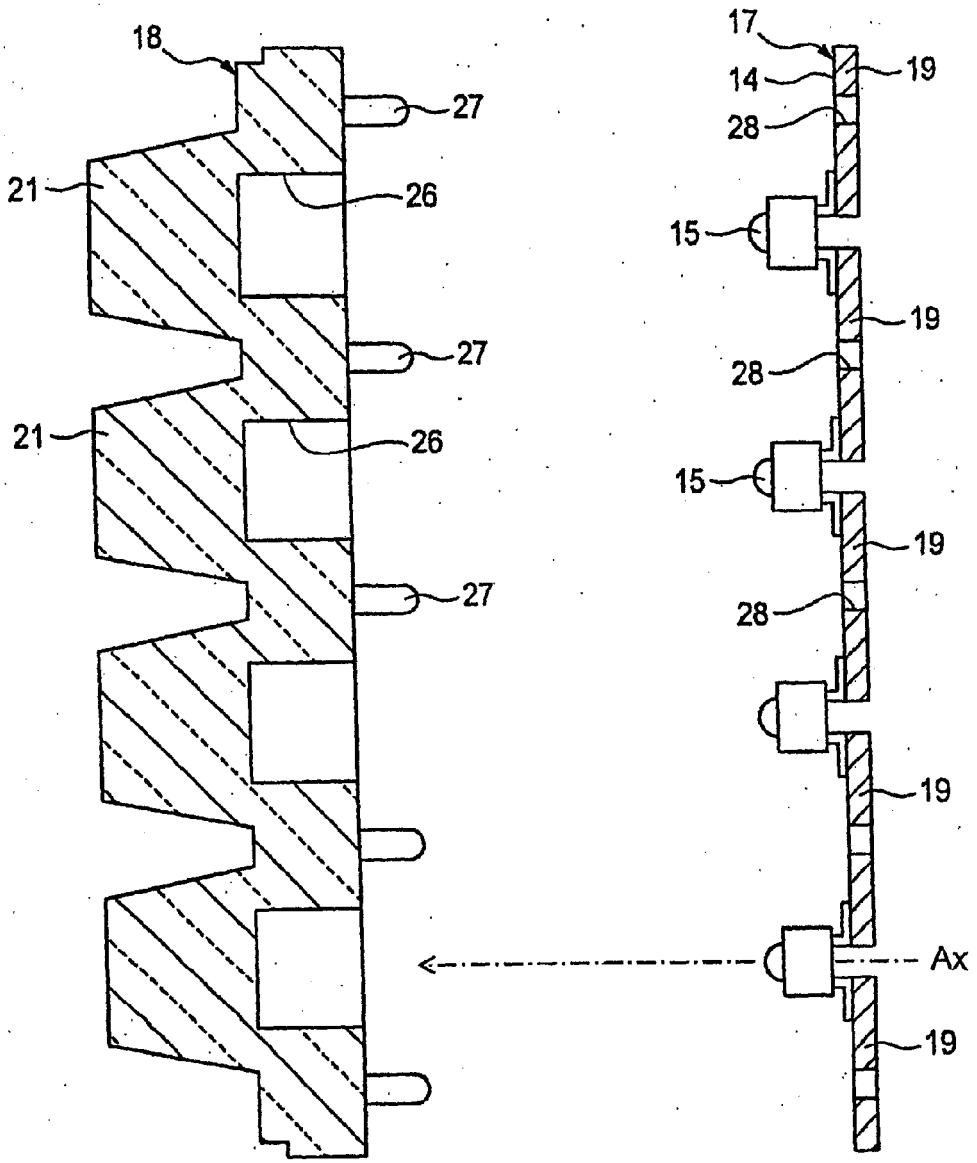


FIG. 4

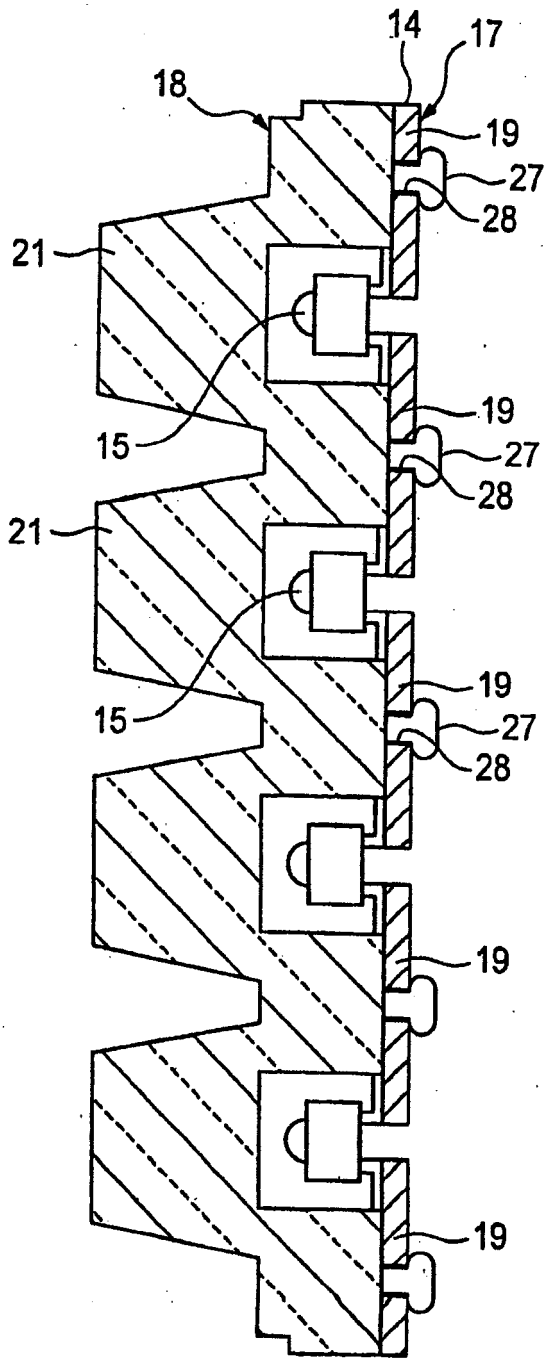


FIG. 5

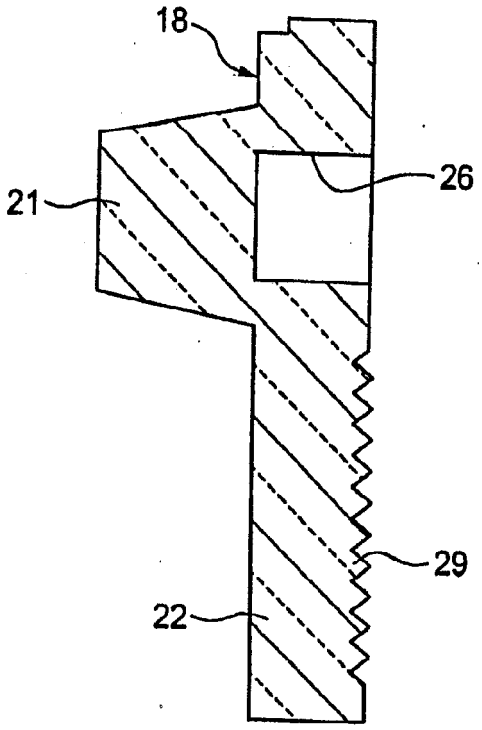



FIG. 6

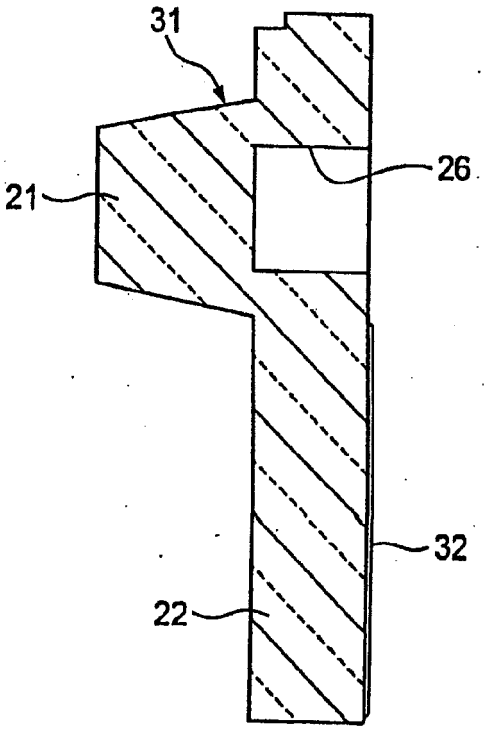


FIG. 7

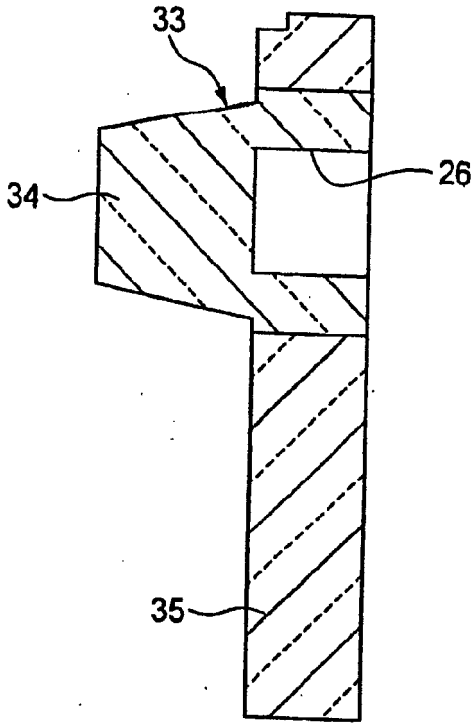



FIG. 8

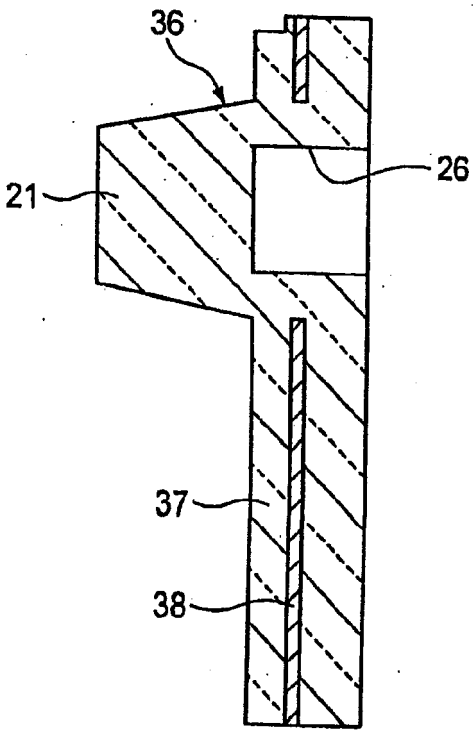
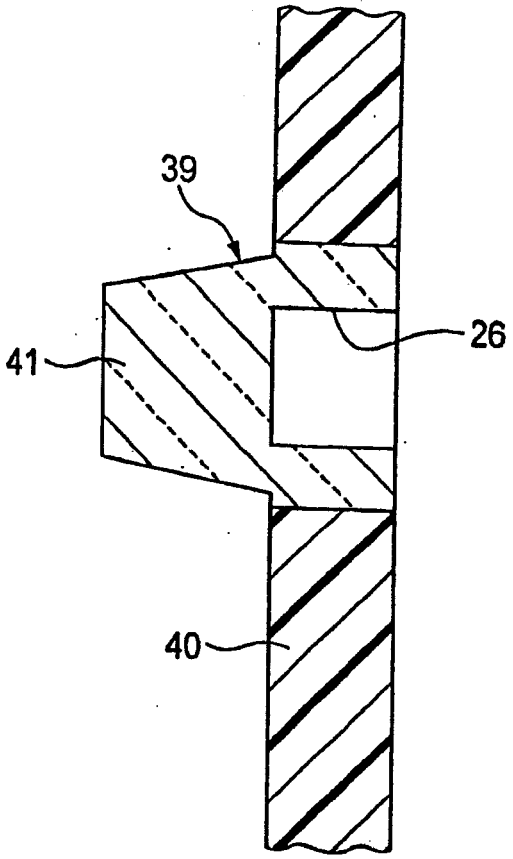


FIG. 9



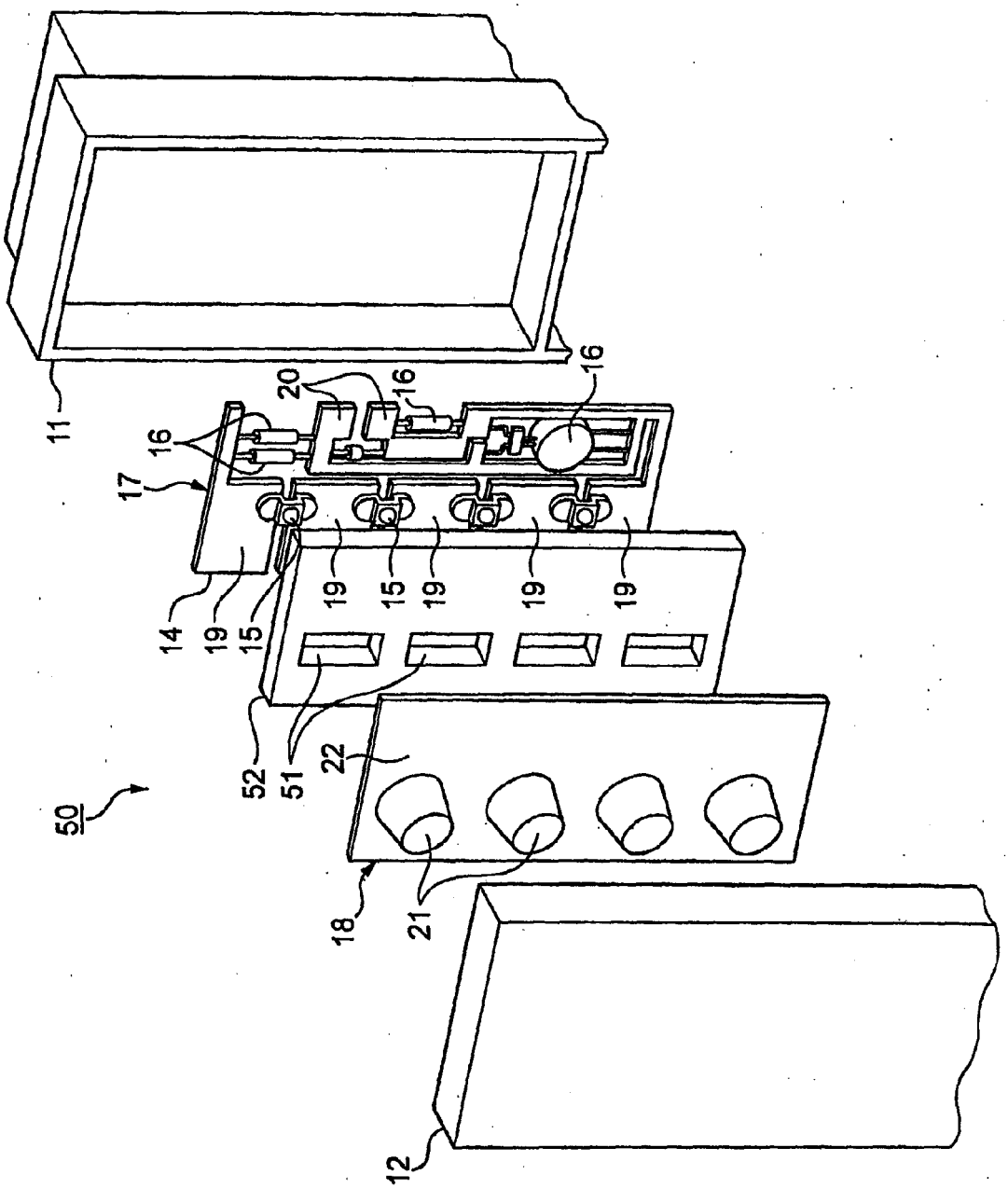



FIG. 10

FIG. 11

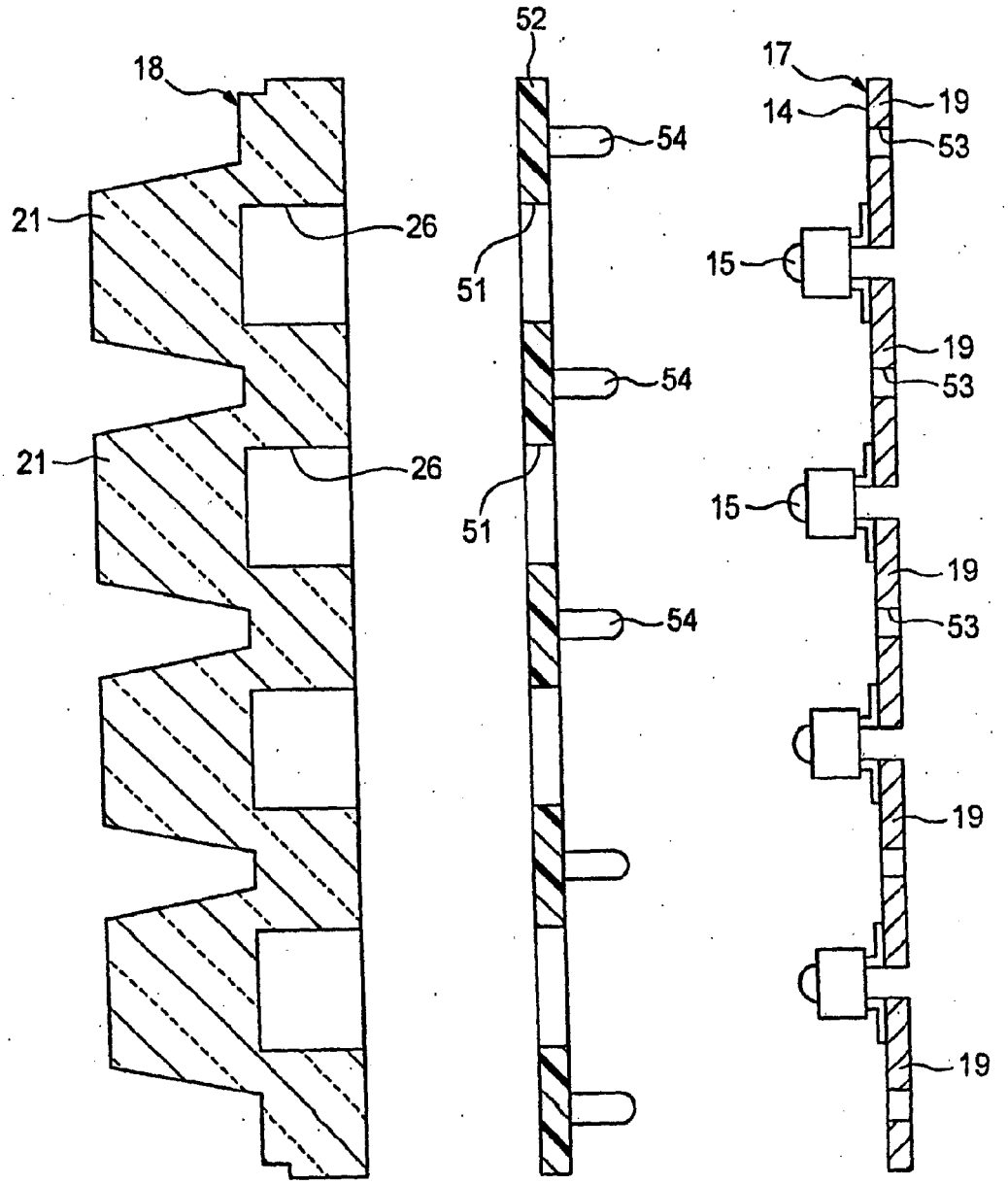


FIG. 12

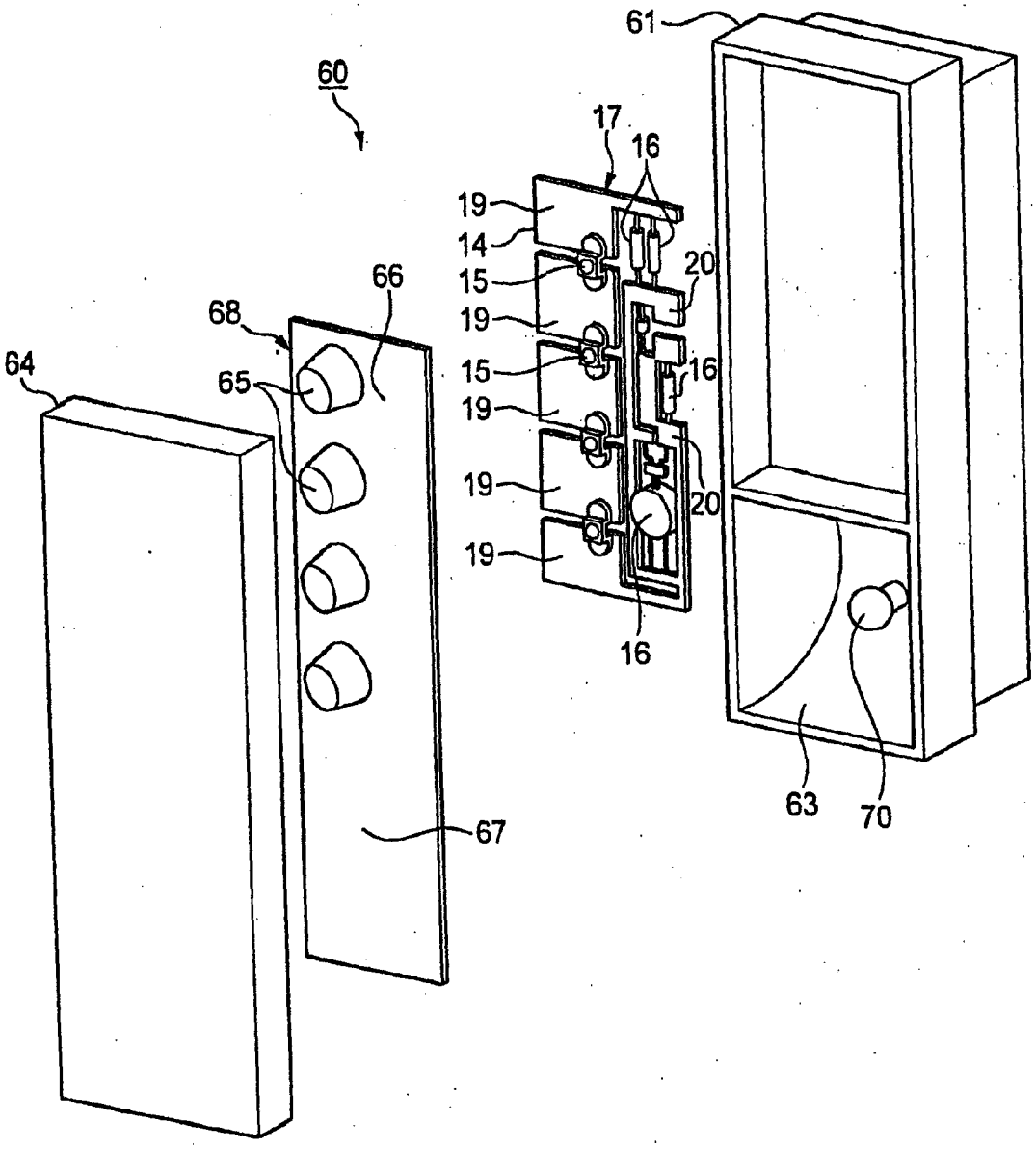
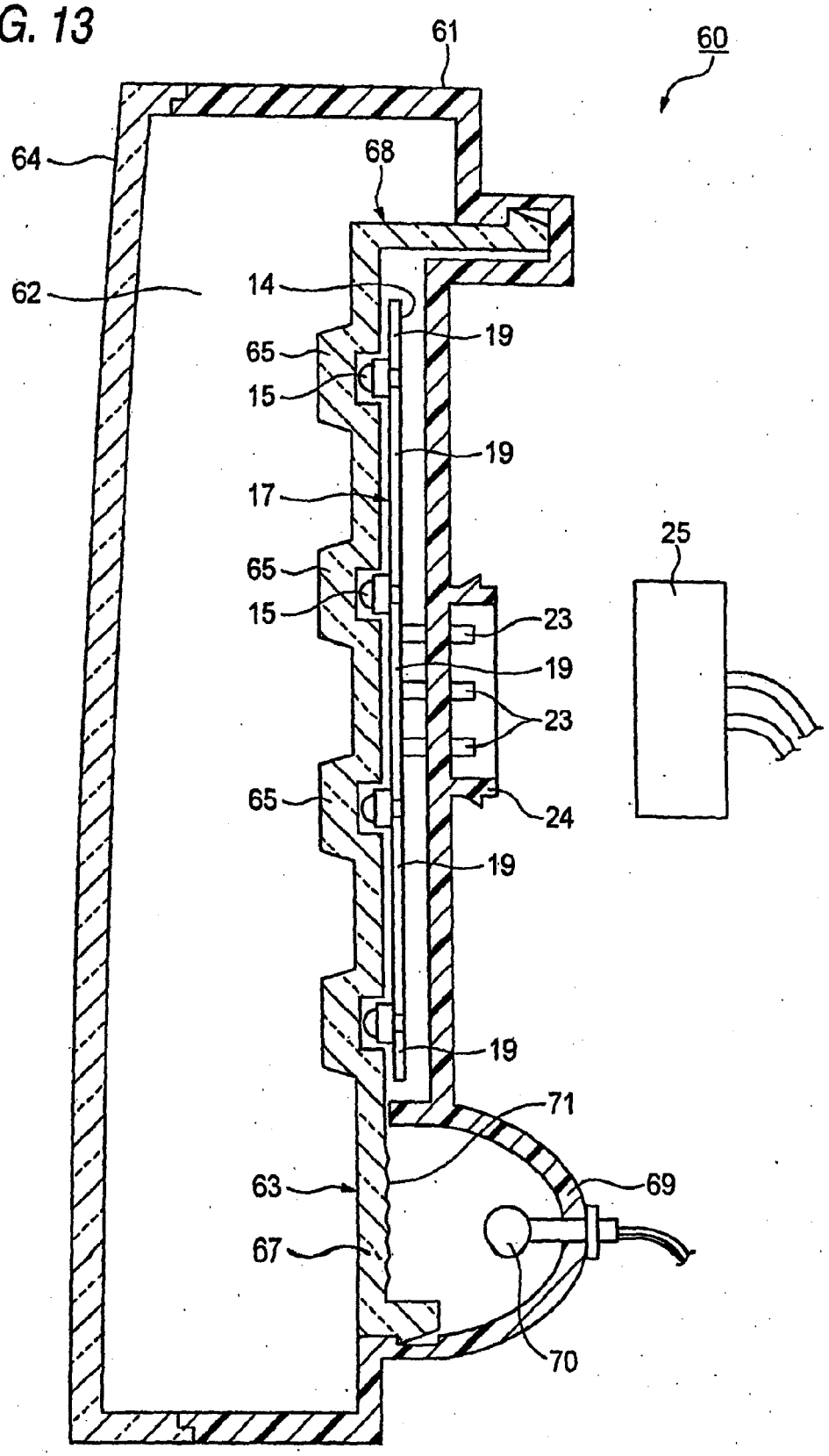


FIG. 13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## REFERENCES CITED IN THE DESCRIPTION

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### Patent documents cited in the description


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